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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

MAY 2 1995

Ref: 8HWM-FF

Mr. Steven W. Slaten
Department of Energy
Rocky Flats Office
P.O. Box 928
Golden, Colorado 80402-0928

RE: **Operable Unit 1 Final Corrective Measures Study / Feasibility Study (CMS/FS) and Proposed Plan; February 1995**

Dear Mr. Slaten:

EPA and its contractor, PRC, have reviewed the Final OU1 CMS/FS Report and Proposed Plan dated February 1995. In addition, DOE responses to EPA comments on the draft version of this report were evaluated. The responses to all comments except General Comment 8, Specific Comments 7, 17, 20, 23, 25, 27, 38, and 40, and Appendix B General Comment 3 were adequate and the text was revised accordingly. Section 1.0 contains the response evaluation and discusses the comments with inadequate responses or revisions. Each above-listed comment is restated in italics and followed by the response evaluation. Section 2.0 contains general comments that pertain to the Final CMS/FS report and Proposed Plan as a whole. Section 3.0 contains specific comments that address individual deficiencies within the CMS/FS report and Proposed Plan. Section 4.0 lists referenced documents.

After reviewing the above cited documents, EPA has concluded that it cannot approve them due to several deficiencies and invalid conclusions. These problems are partly due to the fact that EPA, CDPHE, and DOE had not completed our planned working sessions prior to submittal of the documents. The meetings that did occur were productive in resolving many of the comments that were submitted after our review of the draft version of this report. However, several key issues were not yet resolved when DOE decided to submit the documents. This is not aimed at placing blame, but rather to illustrate how important it is for all parties to take the extra effort to resolve differences prior to submittal of a final document.

Although the CMS/FS does not actually recommend a preferred alternative, in the Executive Summary it is stated that either Alternative 0 (No Action) or Alternative 1 (Institutional Controls with the French Drain) would be the most likely to be preferred, depending on where the point of compliance would be. In the Proposed Plan, DOE presents Alternative 1 as the preferred alternative, even though it would cost more and accomplish less than three other alternatives under consideration. **The CMS/FS does not provide the supporting data or rationale needed to justify such a conclusion, and this is one of EPA's primary concerns.** Of course, the point of compliance does influence any decision that is made, and the continuing disagreement on this issue is an impediment that needs resolution.

Recent data from the OU 1 IM/IRA show that groundwater being collected by the French Drain is essentially free of contaminants, indicating that the leading edge of the plume of contaminated groundwater from IHSS 119.1 is located upgradient of the French Drain. Therefore, using only the French Drain to collect groundwater would be a very inefficient, and potentially, a very costly solution. For this and many other reasons, EPA favors Alternative 2, Groundwater Pumping and Soil Vapor Extraction, which would be a focussed effort to remove the sources of contamination in a much shorter time frame. As our comments indicate, the estimated costs for this type of action, (and several other alternatives) shown in the CMS/FS, are unrealistically high and remediation using this approach could be accomplished for a reasonable cost.

As stated above, EPA feels that it is imperative that the agencies reach consensus for a final remedy of OU 1 prior to further development or revision of these documents. Our recent meetings have been productive in identifying key issues, now we must find ways to resolve the differences. If you have any questions regarding these comments, please contact Gary Kleeman at 294-1071.

Sincerely,

Martin Hestmark

Martin Hestmark, Manager
Rocky Flats Project

Enclosure

cc: Dave George, DOE
Chris Gilbreath, CDPHE
Joe Schieffelin, CDPHE
Mike Rupert, EG&G
Tom Peters, PRC

1.0 RESPONSE EVALUATION

1. *<u>EPA General Comment 8</u>: There is no mention in this document of the buried gas transmission line that crosses OU1 in an east-west direction between Individual Hazardous Substance Site (IHSS) 119.1 and the french drain. The existence of this feature certainly impacts some of the alternatives discussed in this document. Additionally, since this line lies in the path of migrating contaminated groundwater, <u>an evaluation of how it might be affecting migration is needed</u>.*

   <u>Response Evaluation</u>: The response indicated that it is unclear how the transmission line could affect the remedial alternatives presented in the CMS/FS report. This lack of clarity is why the question was first raised in the comment. The potential for impact exists; therefore, the document should discuss the potential. The response also states that the evaluation of the transmission line as a preferential pathway is not within the scope or purpose of the CMS/FS report. The response text reasons that since migration pathways are a remedial investigation (RI) issue, it is too late to discuss these issues at the CMS/FS stage. This claim is inaccurate, given the inherent iterative nature of the RI/FS process. This preferential pathway should be addressed since it is downgradient of IHSS 119.1. In addition, any subsequent characterization and remedial design must take this feature into account.

2. *<u>EPA Specific Comment 7. Page 1-36, Section 1.5.2</u>: This section summarizes the environmental evaluation (EE). It is not clear if the EE evaluated potential OU1 impacts to Woman Creek. Even though Woman Creek is part of OU5, OU1 contamination can migrate to Woman Creek and potential environmental impacts should be assessed. Ecological risks from OU1 contaminants to Woman Creek should be assessed and summarized in the FS so that appropriate remedial alternatives can be evaluated and selected.*

   <u>Response Evaluation</u>: The EE summary does not discuss Woman Creek and associated receptors as was agreed in meetings of the agencies held on December 8 and 14, 1994. Woman Creek is downgradient from OU1 sources; therefore, ecological risks from OU1 contaminants to Woman Creek should be assessed and summarized in the EE summary section so that appropriate remedial alternatives can be evaluated and selected.

3. *<u>EPA Specific Comment 17. Page 3-3, Table 3-1</u>: This table identifies the components of each of the eight (0-7) remedial alternatives. Institutional controls are not listed as part of the four source removal alternatives (4 through 7). The text should clarify whether institutional*

controls are required during the post-closure monitoring period. Institutional controls should be considered because of the high degree of uncertainty associated with dense nonaqueous phase liquids (DNAPLs) and since residual contaminants could still be present and migrate after the source is removed. Institutional controls will likely be required as long as monitoring is required for the alternatives to be protective of human health and the environment.

<u>Response Evaluation</u>: The source removal alternatives do not include institutional control during the post-closure monitoring period. According to groundwater modeling, residual contamination will exist for 10 years after the source is removed. Therefore, institutional controls will likely be required.

4. *<u>EPA Specific Comment 20. Page 3-12, First Paragraph</u>: This paragraph discusses contaminants of concern (COCs) that are recoverable through soil vapor extraction (SVE). The text states that all COCs under consideration are amenable to SVE. However, previous sections of the report identified inorganic contamination at OU1 that is not amenable to SVE. This discrepancy should be clarified.*

   <u>Response Evaluation</u>: The text was not revised to discuss the need to treat nonvolatile contamination. Selenium is also a contaminant of groundwater. The text should discuss why this contaminant is not addressed as part of source removal actions that rely on volatilization.

5. *<u>EPA Specific Comment 23. Page 4-12, Groundwater Modeling</u> The modeling predicts maximum concentrations occurring in approximately 160 years for the remediation scenario. The modeling presumably assumes that the french drain will be decommissioned after the source control measure is implemented. As stated in Comment 18, the french drain will likely continue to operate to address residual contamination and the model should take this into consideration for the remediation scenarios.*

   <u>Response Evaluation</u>: The response states that the text will not be revised because the model results would be identical and no comparisons can be made if the drain is present in all cases. EPA agrees that downgradient concentrations would likely be the same if the drain is assumed for all scenarios. However, the time needed to remediate will change and these remediation time frames are the major difference among alternatives. Other sections of the report and the cost estimate appropriately include french drain operations during post-closure. Modeled conditions should be consistent with likely site conditions to maximize the model's usefulness and to obtain accurate and fair comparisons.

6. <u>*EPA Specific Comment 25. Page 4-12, Last Three Bullets*</u>*: The peak tetrachloroethylene (PCE) concentrations are shown here as being 0.5 micrograms per liter (µg/L) for remediation alternatives but only 0.00862 µg/L for the french drain alternatives. How can remediation that is assumed to remove the source result in greater concentrations of this contaminant? This must be reviewed and corrected or explained. It would be much simpler and clearer to use µg/L as the unit of measure in all text, tables, and graphs when referring to concentrations of organics.*

<u>Response Evaluation</u>: Peak concentrations are still higher in the final CMS/FS report for the source removal options. The explanation provided in the text states that peak concentrations are higher for source removal alternatives because french drain operation was not assumed in the model following source removal. As stated in Comment 5 (above), french drain operation should be assumed in the model and resultant concentrations should be lower as a result.

7. <u>*EPA Specific Comment 27. Section 4.2, Detailed Analysis of Alternatives*</u>*: Throughout the detailed analysis of alternatives, the text states that MCLs will be met at Woman Creek. It is not clear whether MCLs are protective of ecological receptors at Woman Creek. The text should state chemical concentrations at Woman Creek that would be protective to ecological receptors.*

<u>Response Evaluation</u>: Chemical concentrations at Woman Creek that protect ecological receptors are not provided. AWQC for aquatic life should be considered for comparisons and evaluations.

8. <u>*EPA Specific Comment 38. Page 4-77, Section 4.3.5*</u>*: This section evaluates short-term effectiveness. The evaluation does not consider remediation time-frames that are required to reach remedial action objectives (RAOs). EPA guidance states that short-term effectiveness depends on the time required to reach RAOs. Time to remediate is a major difference among alternatives; therefore, the alternatives should be reranked considering this criterion.*

<u>Response Evaluation</u>: Time to remediate is discussed in more detail; however, it is not consistently included in discussions about Alternative 1. The advantages and disadvantages of each alternative should be clearly stated to promote a balanced evaluation of alternatives. In addition, the analysis should be in accordance with EPA guidance (1988).

9. <u>*EPA Specific Comment 40. Page 4-78, Section 4.3.7*</u> *The text states that Alternatives 2 and 3 are significantly more costly than the other alternatives due to the high cost of*

operation and maintenance (O&M) for the Building 891 treatment system for 30 years. EPA does not agree with the cost estimates for Alternatives 2 and 3 for the following four factors.

1) *Actual subcontractor costs for the 891 Treatment Plant for the past year (July 1993-June 1994), have totalled $208,000 in comparison with the $676,000 that is allotted for the same item in the detailed cost estimate in Appendix E.*

2) *A much smaller volume of water from OU1 will be treated once the 881 footing drain flow is no longer collected, further reducing this annual cost.*

3) *As stated on Page 1-37, the plant will likely be converted for sitewide use. The additional O&M costs required resulting from OU1 should be used in the cost estimate, not the total plant O&M cost if this is the case.*

4) *Finally, the basis for estimating operation of the 891 Treatment Plant for 30 years was not provided in the document. It does not appear that a thorough evaluation was performed using existing data and groundwater modeling to estimate the amount of time to remediate that each of these alternatives using the french drain would require.*

<u>Response Evaluation</u>: Responses to the first and fourth factors were adequate and the revisions were appropriate. However, it does not appear that the smaller volume of water was used to estimate costs, as requested in the second factor. It appears that 1994 operating costs were used, which would not fully account for the removal of the Building 881 footing drain flow. In addition, it appears that the total plant O&M was used for the cost estimate, instead of a fraction representing OU1's demand on the plant. It is unlikely that the treatment plant will be used solely for OU1. Costs for Building 891 O&M should be allocated among the other potential sitewide uses to promote an accurate and fair cost comparison.

10. *<u>EPA Appendix B General Comment 3</u>: A significant source of uncertainty in the model results is the source location. The text on page B-2 states "the release mechanism to groundwater is dissolution of the residual (immobile) DNAPL phase." This residual DNAPL is assumed to be located just upgradient of well 4387. The model does not account for the possibility that mobile DNAPL has moved away from the area near 4387 and is still mobile or exists as an immobile pool, some distance from well 4387. A mobile DNAPL could possibly account for the sudden increase in trichloroethene (TCE), PCE, and carbon tetrachloride at well 0487 during fourth*

quarter 1992. Although these concentrations are below 1 percent of solubility (the level usually cited as being indicative of a DNAPL), the bedrock topography in the vicinity has not been mapped in sufficient resolution to indicate whether well 0487 is in the center of the channel-like bedrock surface feature that is believed to provide a preferential groundwater flow path. The two options for dealing with this uncertainty are further characterization (cone penetrometer testing or geophysics to map the orientation of the bedrock surface feature, and a soil gas survey to map high volatile organic compounds [VOCs] concentrations) or modeling numerous source configuration scenarios that incorporate potential DNAPL movement.

<u>Response Evaluation</u>: The response does not directly address uncertainty in source location. Instead, the response states that because the model accurately simulates the timing of the conspicuous spike in concentration related to the installation of the french drain and extraction well, the model is considered accurate to enable reliable and conservative predictions at the french drain and Woman Creek. There is, however, significant doubt about how the model managed to simulate this spike, given the flow rate that is simulated at the extraction well.

Appendix B states that the model explains the elevation of contaminant levels at well 0487 in the latter half of 1992 as being caused by the timing of the installation and operation of the french drain and extraction well, both of which are simulated in the model. According to this interpretation, a slug of contamination was drawn down the slope by the increased hydraulic gradient caused by the newly installed french drain in early 1992. The slug raised contaminant levels in well 0487, located midway between the source area and the french drain. Next, an extraction well became operational in early 1993, decreasing the hydraulic gradient and pulling contaminants away from well 0487 and back toward the extraction well, which is located near the source area, thus reducing concentrations at well 0487. The text also provides the pumping rate that is simulated at the extraction well, which is 0.173 cubic feet per day (ft^3/d) or 1.2 gallons per day (gpd). It seems implausible that a well pumped at 1.2 gpd could have a capture zone that extends more than 100 feet downgradient, encompassing well 0487. This aspect of model behavior should be investigated further before it can be concluded that the model is a reasonable representation of field conditions and is capable of explaining the contaminant spike.

The response also states that all site data concerning historical use do not indicate the presence of a mobile or immobile DNAPL pool. However, no site data are provided to support this contention; instead, the text provides only a hypothesis that is not supported by data.

The model may be adequate to predict future concentrations at downgradient points, if downgradient concentrations are considered to be insensitive to source location. This possibility could be demonstrated through model simulations using a source located at various depths and noting the model's sensitivity. The model should not be used to draw conclusions about the location of the source.

2.0 GENERAL COMMENTS

1. The final CMS/FS report is much improved and more adequately evaluates the differences among alternatives and provides a much more objective evaluation of the alternatives. However, there are several deficiencies remaining in the document.

2. According to the CMS/FS report, DOE favors pumping the french drain for an extended period of time and monitoring groundwater indefinitely rather than, for the same cost or less, attempting to remove the source and discontinue groundwater monitoring much sooner. According to the comparison between Alternative 1 and Alternatives 2, 3, and 4 in the report, costs are approximately the same, short-term risks resulting from disturbing the subsurface are not a concern, ARARs can be met sooner, the preference for treatment will be satisfied, RAOs will be met, and the toxicity, mobility, and volume (TMV) of contamination will be reduced. Presumably, implementability is the major concern. If this is the case, implementability concerns with SVE and hot-air mechanical mixing should be emphasized to support the preferred alternative. All factors, including uncertainty with source removal success (if applicable), should be discussed to provide further support for the preferred alternative.

3. The preferred alternative does not appear to meet the second RAO. The second RAO is to prevent migration of contamination from subsurface soils to groundwater that would result in groundwater contamination in excess of ARARs for OU1. <u>The preferred alternative (institutional controls and the french drain) does not prevent migration of contaminants to groundwater and ARARs are currently exceeded.</u>

4. The document states that OU1 surface soils have been identified as a medium of concern but are being addressed as part of OU2. The integration of OU1 and OU2 should be discussed in more detail. The CMS/FS report indicates that surface-soil risks after hot spots have been removed are acceptable. The text should clarify the rationale for remediating OU1 surface soils as part of OU2.

3.0 SPECIFIC COMMENTS

1. Page 1-11, Second Paragraph: This paragaph incorrectly states that the French Drain collects surface water. Since the French Drain is located below the ground surface at approximately the top of bedrock, it actually only collects ground water from the Upper Hydrostratigraphic Unit (UHSU).

2. Page 1-12, Second Paragraph: The Building 881 footing drain was disconnected from the French Drain collection system in September 1994, and so is now again a source of recharge to the UHSU at OU 1 contrary to what is stated here.

3. Page 1-16, Last Paragraph: The paragraph attempts to correlate soil gas survey results with groundwater data. The text states that PCE was not detected in groundwater samples immediately downgradient of a high soil gas detection, and suggests that either the solvent release did not reach the water table or that groundwater is not present at the release location. However, another very likely explanation that PCE was not detected in downgradient wells is that these wells may not have been placed in preferential pathways (paleochannels).

4. Page 1-18, Last Full Paragraph: This paragraph states that the historical maximum concentration of VOCs in groundwater at OU 1 occurred in samples collected from well 4787 located downgradient of the french drain. EPA has checked the historical data and found that this is not correct. Samples from well 4787 have never shown VOCs to be present in concentrations greater than regulatory standards. As a result, this entire paragraph should be deleted since its statements are based on incorrect information. (Well 4787 was probably confused with well **4387** which does have significant VOC contamination but is **upgradient** of the French Drain in IHSS 119.1).

5. Page 1-23, First Full Paragraph: This paragraph states that polychlorinated biphenyls (PCBs) are not considered to have originated within OU1. However, the text states that PCBs have been detected in subsurface soils, which indicates that these PCBs may be due to spills that occurred at OU1. In addition, a figure in the Draft CMS/FS Report indicated higher PCB concentrations at IHSS 119.1 and lower concentrations in surrounding areas. That figure suggested that PCBs originate at the IHSS areas and that the contaminants are transported via wind-blown soils. The text should address this possibility.

6. Page 1-23, Second paragraph: This paragraph discusses radionuclide contamination at OU 1, and states that widespread plutonium and americium in surface soils

originated in OU 2. The last sentence however, incorrectly specifies uranium, rather than plutonium and americium, and should be changed to avoid confusion.

7. <u>Page 2-36, Last Paragraph</u>: The description of the collection system of the IM/IRA provided here does not reflect changes that were made in the Fall of 1994. Since then, automatic pumping of the collection well by level switches has been discontinued. It is EPA's understanding that the pump is manually activated on a daily basis, and that the water is pumped directly to a tank truck which is then used to transfer the water to the treatment plant instead of via the French Drain. This information is important because analysis of the collection well water samples continue to show the presence of volatile organic compounds in the 500-1000 ppb range. The water that is being passively collected by the French Drain does not have similar analytical results, suggesting that the plume of contaminated ground water from IHSS 119.1 has not yet reached the French Drain.

8. <u>Page 3-1, Second Paragraph</u>: The last two sentences in this paragraph mention planned modifications to the treatment system and state that the details are provided in Section 2 of the document. These details could not be found, but are important and should be included in the document.

9. <u>Pages 3-4 through 3-6, Section 3.2.2</u>: This section describes Alternative 1: Institutional controls with the French Drain, but does not specify whether the collection well would continue to be used to extract contaminated ground water from IHSS 119.1. This needs to be clearly stated since it is an integral part of the existing IM/IRA. In addition, as stated above, recent analytical data shows that water being collected by the French Drain has very low levels of contaminants, so the alternative of using only the French Drain to collect ground water for treatment would probably not be very effective.

10. <u>Page 3-11, Second Paragraph</u>: In this description of Alternative 2, it is stated that after the SVE system is decommissioned, the French Drain would continue operating for 10 years to remediate the groundwater plume currently flowing down the hillside. This same 10 year period of French Drain operation is also included for all of the other source removal alternatives (3-5). The basis for this estimate of 10 years of French Drain Operation is not given, and apparently the estimate does not account for differences between the alternatives regarding the extent and effectiveness of remediation. The estimated cost shown in Appendix A, Alternatives 4 & 5, for 10 years of operation and maintenance of the French Drain and ground water treatment at Building 891 is $3,113,031. This amount is far greater than the capital costs for any alternative except

number 5, and is about 40% - 50% of the total cost of alternatives 2, 3 and 4.

EPA questions whether treatment of the ground water would be necessary after source removal and remediation occurs. It seems that for a plume of this limited size, virtually all of the contaminated ground water could be extracted and treated during the initial remediation phase. As a method of monitoring, the French Drain might need to be used to collect ground water for some time after the removal and remediation phase. The collected water could be sampled, and if it meets regulatory standards without treatment, could then be discharged. If some additional treatment were needed, it is expected that the 891 treatment plant would be shared by other RFETS projects, so OU 1 would not bear the entire cost of its operation as shown in the cost estimates.

Therefore, this aspect of Alternatives 2 - 5 needs to be more realistically presented with a supporting basis, thorough evaluation and cost estimate that takes into account the factors discussed above.

11. <u>Figure 3-3</u>: This figure shows the area in which soil vapor extraction (SVE) wells might be located for Alternatives 2 and 3. Since well 0487 is known to be located within the plume of contaminated ground water, it seems that the SVE wells would need to be located at least to that point and probably to some extent further downgradient. As a result, the estimate of 36 SVE wells is probably too low, and should be doubled or tripled to more realistically reflect the size of the plume.

12. <u>Page 3-21, Third Paragraph</u>: For the reason stated above, the estimated source area of 100 feet by 100 feet, used to determine the area needing mechanical mixing, may underestimate the area that would need to be remediated. It might also be more cost effective and involve shorter remediation time if the ground water extraction and mechanical mixing are applied to a larger area than is estimated here.

13. <u>Page 3-22, First Paragraph</u>: More detail is needed in this description of Alternative 4, regarding the number of extraction wells that would be needed to dewater areas before and after mechanical mixing. It is suggested that dewatering prior to treatment is necessary, but if so, why does this only apply to the initial soil column?

14. <u>Page 3-36, Third Paragraph</u>: In this description of Alternative 5, scraping and stockpiling of surface soils for later treatment with OU 2 surface soils is planned. The description for Alternative 4 does not specifically address the issue of surface soils. The disposition of surface soils for Alternative 4 also needs to be stated since

mechanical mixing would affect surface soils as well as subsurface soils.

15. Page 4-22, Last Paragraph: The list of specific chemicals that exceed standards also needs to include PCE and selenium.

16. Page 4-74, First Full Paragraph: This paragraph states that Alternative 1 is currently meeting RAOs for the site; however, the second RAO is not currently met. The text should be revised accordingly. Alternatives should be accurately compared to evaluation criteria to promote a fair evaluation of alternatives.

17. Page 4-75, First Paragraph: This section compares the differences in modeled peak concentrations among alternatives. The text states that compliance with groundwater standards would be achieved by the year 2010 under Alternative 1. For the source removal alternatives, the text states that compliance would be achieved 10 years after the source is removed. Assuming sources are removed by 1998, compliance would be achieved by 2008, only 2 years before Alternative 1. Presumably, these time frames result because future contaminant concentrations were modeled assuming no french drain operation for Alternatives 2 through 5 (source removal alternatives). The text indicates that the french drain will be operated to accelerate remediation of residual contamination under Alternatives 2 through 5. If this is true, french drain operation should be incorporated into the groundwater model for these alternative scenarios. Compliance time frames should be reestimated for Alternatives 2 through 5 based on modeling the french drain operation.

Appendix B

18. Page B-3, Fourth Paragraph: The third sentence in this paragraph lists four wells; 0487, 4387, 4787, and 5587 as having shown high concentrations of VOCs. Wells 4787 and 5587 are both downgradient of the French Drain and there have been virtually no VOCs detected in samples from either well. If the data used in modelling showed significant concentrations of VOCs in 4787 or 5587, this data needs to be submitted to EPA. If not, this sentence needs to be corrected and a response should address whether the data used in modelling was matched with the correct wells.

19. Page B-8, Second Paragraph: The text states that the movement of DNAPL into bedrock fractures is unlikely because there is insufficient DNAPL head available to displace water out of the fracture. Recent research suggests that a significant amount of contaminant mass can be transferred from a DNAPL into a fractured or porous rock matrix through molecular diffusion (Walker et al. 1994). DNAPL may not

have to physically displace the water in thin fractures for much of the DNAPL mass to diffuse into pore or fracture water and contaminate the bedrock adjacent to the contact. This contaminant transport mechanism should not be neglected. Remedial options may need to remove or treat several feet of bedrock in order to be effective.

20. Page B-9, First Paragraph: This paragraph provides an explanation for the seasonal fluctuations in contaminant concentrations observed in samples from wells 0487 and 4387. High concentrations are believed to coincide with the seasonal saturation of residual DNAPL located in the variably saturated zone. This interpretation provides the basis for the source term (the source supplies solvents at their solubility limit for 6 months of the year and is dormant for the other 6 months), and supports the contention that the source consists of residual DNAPL located in the variably saturated zone.

    It is questionable whether the results of the simulation can be used to identify the source location and phase. The simulation results and existing data do not provide a strong enough case to rule out other explanations for the observed and simulated contaminant fluctuations. Oscillations in contaminant concentrations are apparent on the figures provided in the back of Appendix B; they are somewhat variable with regard to season, but often are highest during the second half of the year. The Final Well Evaluation Report (EG&G 1994a) suggests that seasonal fluctuations in contaminant concentrations are a result of a dilution phenomenon:

    > The possible seasonal behavior displayed by TCE and "total" VOCs may be controlled by decreasing volumes of groundwater from the second to the fourth quarter, concentrating the more mobile constituents (EG&G 1994a).

    Based on this interpretation, the source could be a mobile or immobile DNAPL or residual DNAPL located at virtually any depth in the vertical column, from the variably saturated zone to below the colluvial/bedrock contact.

    The source term used in the model is conservative with respect to source strength and is adequate for the purpose of predicting contaminant levels in the surficial deposits. However, the simulation results should not be used to establish the depth of the source.

21. Page B-16, Paragraph 3: The text states that the simulated flow into the extraction well is about 0.173 ft^3/d, which is similar to a previously measured average flow into the extraction well of 0.225 ft^3/d. Both values are between 1 and 2 gpd. These rates seem exceptionally low, even for a

well screened in a low-permeability unit with a limited saturated thickness.

The OU 1 IM/IRA October through December 1994 Quarterly Report provides an average flow rate for the extraction well of 80 gpd which occurred when the pump was allowed to pump the well dry. The flow rate of 0.225 ft^3/d was measured at a time when the extraction well was not functioning properly due to mechanical problems. The calibrated model should reflect actual measured flows that are representative of site conditions.

Proposed Plan

The proposed plan should be revised based on the above comments provided for the CMS/FS report.

1. Proposed Plan, Page 4: The contaminants in bold type should be added to the glossary to inform the public about the nature of the hazards at OU1. In addition, selenium is a ground water contaminant and needs to be listed as such in this section.

2. Proposed Plan, Page 4: The text summarizes site risk and the residential exposure scenario is discussed. The text should be revised to clarify that this assumption is conservative and that residential development is unlikely.

3. Proposed Plan, Page 5: This page summarizes remedial action alternatives that were subjected to the detailed analysis. However, a description of institutional controls is not provided. The Alternative 1 discussion should be revised to describe institutional controls, especially since it is the preferred alternative.

   Since Alternatives 2 through 5 all include a post remediation ten year period of ground water collection and treatment which accounts for up to 50% of the total costs of these alternatives, this aspect must be included in the summaries of each alternative.

4. Figure 3: This chart is a good way to summarize the comparison of alternatives and presents an easily understood justification of the preferred alternative, but it needs some revision. Alternative 1 is given better ratings than it deserves in several categories, especially in overall protection, compliance with ARARS, and short term effectiveness, and therefore needs to be revised accordingly. It might also be better to present the estimated total costs instead of symbols, to allow the reader to make a more informed judgement between the alternatives.

4.0 REFERENCES

EG&G 1993. Final Phase III RFI/RI, Rocky Flats Plant, 881 Hillside Area. November.

EG&G 1994a. Final Well Evaluation Report, EG&G Rocky Flats, Inc., Golden, Colorado. April 29.

EG&G 1994b. Quarterly Report for April through June 1994, Operable Unit No. 1, IM/IRA Treatment Facility. EnvironmentalRestoration, Facilities Operations Management, EG&G Rocky Flats. Transmitted August 26.

U.S. Environmental Protection Agency 1988. "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final." EPA/540/G-89/004, OSWER Directive 9355.3-01, October.

Walker, B.L., Gillham, R.W., and Cherry, J.A. 1994. Diffusive Disappearance of Immiscible-Phase Organic Liquids in Fractured Geologic Media. Ground Water, Volume 32, Number 5. September-October 1994.